



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/648,399	08/27/2003	Keiichi Sato	HIRA.0122	5338
38327	7590	02/16/2006	EXAMINER	
REED SMITH LLP 3110 FAIRVIEW PARK DRIVE, SUITE 1400 FALLS CHURCH, VA 22042			ALANKO, ANITA KAREN	
			ART UNIT	PAPER NUMBER
			1765	

DATE MAILED: 02/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/648,399

Applicant(s)

SATO ET AL.

Examiner

Anita K. Alanko

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/12/05 amdt.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/12/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Adams et al (US 6,649,138 B2).

Adams discloses a method comprising the steps of:

modifying semiconductor nanoparticles (col.6, lines 24-40) with oil-soluble materials (coating by TOPO/TOP, col.13 lines 21-22) for surface modification (since they are on the surface of the nanoparticles);

converting the oil-soluble materials for surface modification into water-soluble materials for surface modification at the interface between an organic solvent and water (dispersant, col.13, lines 33+ and col.19, lines 7-27); and

shifting the semiconductor nanoparticles from an organic phase to an aqueous phase by the conversion (since they are soluble in water).

Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Willner et al (US 2004/0048272 A1).

Willner discloses a method comprising the steps of:

modifying semiconductor nanoparticles (CdS) with oil-soluble materials (formation of inverse micelles) for surface modification (broadly interpreted, the micelle is surface modification, [0073]);

converting the oil-soluble materials for surface modification into water-soluble materials for surface modification at the interface between an organic solvent and water (thiol-capped nanoparticles, [0074] or DNA-modified nanoparticles [0077]-[0079]); and

shifting the semiconductor nanoparticles from an organic phase to an aqueous phase by the conversion (since they are soluble in water, [0080]).

Claim 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Gerion et al (*J. Phys. Chem. B* 2001).

Gerion discloses a method comprising the steps of:

modifying semiconductor nanoparticles (with a diameter of between 3 and 14 nm, Fig.5) with oil-soluble materials (coating by TOPO/TOP, starting materials shown in Fig.1; page 8863, "Experimental Section" part "B") for surface modification (since the coating is on the surface of the nanoparticles);

converting the oil-soluble materials for surface modification into water-soluble materials for surface modification at the interface between an organic solvent and water (last step shown in Fig.1 the functional groups of thiol and phosphate "to tailor the nanocrystal surface functionality", or MPA-coated nanocrystals, see page 8862, 2nd column, section labeled "Mercaptopropionic Acid-Coated Nanocrystals"); and

shifting the semiconductor nanoparticles from an organic phase to an aqueous phase by the conversion (since they are soluble in water, p.8868, col.2, lines 15-18).

As to claims 2-3, Gerion discloses to “photobrighten” the nanoparticles by irradiation of aerated solutions (page 8869, col.1, lines 41-42, 48-49), which encompasses the cited size-selective photoetching, thereby regulating particles sizes (since the solution is brightened, some particles are dissolved and the relative monodisperse particles remain in solution) and monodispersing the semiconductor nanoparticles (since the solution is brightened). Since the same critical steps are performed in Gerion as in the instant method, the same result of peeling is expected. The preamble is given little weight.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerion et al (*J. Phys. Chem. B* 2001) in view of Torimoto et al (*J Phys Chem B* 2001).

The discussion of Gerion from above is repeated here.

As to claims 2-3, Gerion does not recognize that irradiating the aerated solution causes size-selective etching. Torimoto teaches that size-selective photoetching is a useful technique for forming ultrasmall semiconductor nanoparticles (see for example, "Introduction" and "Conclusion" sections on pages 6838-6839, 6844). It would have been obvious to one with ordinary skill in the art to use size selective photoetching, thereby regulating particle sizes, monodispersing them, peeling and converting the materials for surface modification, in the method of Gerion because Torimoto teaches that it is a useful technique for forming small semiconductor nanoparticles.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-3 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 of U.S. Patent No. 6,911,082 B2. Although the conflicting claims are not identical, they are not patentably distinct from each other because transporting "between" an aqueous layer and an organic layer encompasses shifting to an aqueous phase.

Terminal Disclaimer

The terminal disclaimer filed on 12/12/05 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of 10/453,546 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Response to Amendment

Claim 1 remains rejected under 35 U.S.C. 102(e) as being anticipated by Adams et al (US 6,649,138 B2).

Claim 1 is newly rejected under 35 U.S.C. 102(e) as being anticipated by Willner et al (US 2004/0048272 A1).

Claims 1-3 are newly rejected under 35 U.S.C. 102(b) as being anticipated by Gerion et al (*J. Phys. Chem. B* 2001).

Claims 2-3 are newly rejected under 35 U.S.C. 103(a) as being unpatentable over Gerion et al (*J. Phys. Chem. B* 2001) in view of Torimoto et al (*J Phys Chem B* 2001).

The 103 rejection over Adams in view of Tomimoto is withdrawn. Applicant's point is well taken that Tomimoto teaches photoetching before converting to water-soluble materials, not

before. However Torimono still teaches that photoetching is a known technique- and therefore it is obvious to use photoetching as disclosed Gerion for the purpose of purifying or size-selection as taught by Torimoto.

The terminal disclaimer over 10/453,546 has been reviewed and is accepted. The claims remain rejected under double patenting over US 6,911,082 B2.

Response to Arguments

Applicant's arguments filed 12/12/05 have been fully considered but they are not persuasive to the extent they still apply. Applicant argues that Adams discloses that a modifying group on the surface of a semiconductor nanoparticle is further modified with a hydrophilic group that causes a hydrophobic interaction with the modifying group. This is not persuasive because applicant has not specifically pointed out the errors in the examiner's rejection. As broadly interpreted, Adams discloses the method has cited in claim 1. The claim cites to convert materials into water-soluble materials- the claim does not cite that groups on the surface cannot be further modified.

Applicants arguments about the Sato '082 patent are not commensurate in scope with what is claimed in Sato '082. The claims of the instant invention are not limited to single layers, and can include multiple layers. The claims of Sato '082 cite to transform between a hydrophilic and lipophilic solution (claim 1 of the instant invention) and to use size-selective photocorrosion (claims 2-3 of the instant invention). Sato '082 uses thiol materials (claim 4, which form water-soluble compounds) and TOPO/TOP materials (claims 5-6, which form oil-soluble materials).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anita K. Alanko whose telephone number is 571-272-1458. The examiner can normally be reached on Mon-Fri until 2:30 pm (Wed until 11:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Anita K. Alanko
Anita K Alanko
Primary Examiner
Art Unit 1765